

REMARKS

Independent claims 1, 8, 16, 29, 42 and 46 have been amended. Claims 2-5, 9-10, 24-27, 37-38, 48-49 and 52 have been canceled. Claims 6-7, and 46 have been withdrawn. The preambles of the pending claims have been amended to recite a "method" rather than the "process". Reexamination and reconsideration are respectfully requested.

In the Office Action, claims 1-2, 4, 16 and 18 were rejected as being anticipated by Koyanagi (US 2002/0137239 A1). The other independent claims 8, 29, 42 and 46 were rejected as being obvious over Koyanagi in view of either Ota (US 6,436,777) or Bloom. Applicants respectfully traverse these rejections in view of the amendments made with respect to the independent claims and the following remarks.

As recited in independent claims 1, 8, 16, 29, 42 and 46, the present invention, among other things, relates to a method for forming an underlying film, wherein the underlying film is an oxide film, and has a thickness of 6-12 Å.

In contrast, the primary Koyanagi reference, while providing a fabrication method for a dielectric film sample, fails to disclose, teach or even suggest an oxide underlying film having a thickness of 6-12 Å. Accordingly, it is respectfully submitted that the amended claims are not anticipated by Koyanagi.

Moreover, the deficiencies in Koyanagi are not remedied by either Ota or Bloom. Ota likewise does not disclose, teach or suggest the thickness of the

underlying film. Likewise, Bloom fails to disclose, suggest or hint at a thickness for the underlying film.

In view of the above, Applicants respectfully submit the independent claims are patentable over Koyanagi, whether taken alone or in combination with Ota or Bloom.

Regarding the various dependent claims that were rejected in the Office Action as being obvious over Koyanagi in view of Suzuki et al. (US 6,497,783), along with various other secondary references. Applicants further respectfully traverse these rejections as well.

In particular, Suzuki fails to remedy the deficiencies in Koyanagi as Suzuki does not disclose, teach or suggest an underlying oxide film having a thickness of 6-12 Å.

Moreover, Applicants' invention achieves unexpected results based on the claimed thickness range relative to the prior art, as discussed below.

Fig. 14 shows a change in the electrical film thickness (T_{eq}) of an insulating film ($HfSiO$) and an oxide film (SPA_{Ox}) fabricated under the insulating film with respect to the oxidation time. Fig. 15 shows uniformity in the electrical film thickness with respect to the oxidation time. As can be seen from Fig. 15, the uniformity in the electrical film thickness ("Range") of 1-2.5 Å is preferred and the corresponding oxidation time is 20-70 sec. Next, an oxide film

thickness of the oxide film fabricated by an oxidation time of 20 sec. and 70 sec. will be obtained with Fig. 14.

In Fig. 14, the vertical axis shows the total film thickness ($\text{HfSiO} + \text{SPAOx}$) of an insulating film (HfSiO) and the oxide film (SPAOx) fabricated under the insulating film. As shown in Fig. 14, the total film thickness is about 22 Å at 20 sec of oxidation time and the total thickness is about 28 Å at 70 sec. of oxidation time. The thickness of the initial insulating film before oxidation is 16 Å as can be seen from the thickness at the oxidation time 0 sec. Accordingly, the oxide film thickness at the oxidation time 20 sec. is 6 ($=22-16$) Å and the oxide film thickness at the oxidation time 70 sec. is 12 ($=28-16$) Å. Therefore, as can be seen from the experimental results shown in Figs. 14 and 15, the oxidation film thickness 6-12 Å can achieve an excellent uniformity of the oxidation film fabricated between a substrate and the insulating film. The uniformity has an important beneficial effect on the electrical properties of an electrical device.

Accordingly, Applicants' claimed range of oxide film thickness of 6-12 Å of the present invention can achieve the remarkable and unexpected effect with respect to improving the electrical properties of an electrical device.

In view of the above, Applicants respectfully submit the amended claims are patentable over the art of record. While Applicants gratefully acknowledge the indicated allowability of certain dependent claims, for the foregoing reasons,

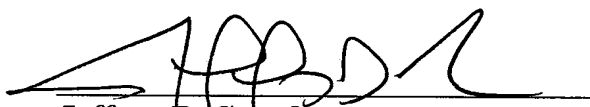
Applicants respectfully submit all claims are now allowable over the art of record. An early notice to that effect is solicited.

If there are any questions regarding this amendment or the application in general, a telephone call to the undersigned would be appreciated since this should expedite the prosecution of the application for all concerned.

If necessary to effect a timely response, this paper should be considered as a petition for an Extension of Time sufficient to effect a timely response, and please charge any deficiency in fees or credit any overpayments to Deposit Account No. 05-1323 (Docket #101249.55458US).

Respectfully submitted,

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